

1. A data model for characterizing the interaction of all elements of a computer network comprising:

5

of the network, which is contained within said data model;

the network, which is contained within said data model;

10

information of the network, which is contained within said data model; and

15

2. The data model of claim 1, further comprising:

20

4. The data model of claim 3, wherein at least one of said plurality of software entities is optionally related to at least one of said plurality of hardware entities in a many-to-one relationship.

5. The data model of claim 3, wherein at least one of said plurality of configuration entities is optionally related to at least one of said plurality of DNS entities in a many-to-one relationship.

6. The data model of claim 3, wherein at least one of said plurality of  
5 DNS entities is optionally related to at least one of said plurality of network entities in a many-to-one relationship.

7. The data model of claim 1, wherein said plurality of software entities comprises:

- a plurality of units entities;
- 10 a plurality of unit monitor types entities;
- a plurality of unit conflicts entities;
- a plurality of application role units entities;
- a plurality of platforms entities;
- a plurality of unit packages entities;
- 15 a plurality of account role units entities;
- a plurality of device pool role units entities;
- a plurality of device pool roles entities;
- a plurality of packages entities;
- a plurality of account packages entities;

09699353-103100

a plurality of account roles entities;  
a plurality of device roles entities;  
a plurality of dependent roles entities;  
a plurality of included packages entities;  
5 a plurality of application packages entities;  
a plurality of device pool packages entities; and  
a plurality of application roles entities.

8. The data model of Claim 7, wherein said units entities represent software units that form part of a software package, and wherein said units entities  
10 are related to:
- said unit monitor types entities by a one-to-many relationship;
  - said unit conflicts entities by at least one-to-many relationship;
  - said application role units entities by a one-to-many relationship;
  - said unit packages entities by a one-to-many relationship;
  - 15 said account role units entities by a one-to-many relationship;
  - said device pool role units entities by a one-to-many relationship; and
  - said plurality of network entities by a many-to-one relationship.

09699353 103100

9. The data model of Claim 7, wherein said unit monitor types entities represent the type of monitoring associated with individual units, and wherein said unit monitor types entities relate to said units entities by a many-to-one relationship.

5           10. The data model of Claim 7, wherein said unit conflicts entities identify conflicts between units represented by said units entities, and wherein said unit conflicts entities are related to said units entities by at least one many-to-one relationships.

10           11. The data model of Claim 7, wherein said application role units relate said units entities to said software application roles entities by way of a many-to-one relationship with said units entities and a many-to-one relationship with said application roles entities.

15           12. The data model of Claim 7, wherein said platforms entities represent the computer platform upon which software units, represented by said units entities, are to run, and wherein said platforms entities are related to:

said units entities by an optional one-to-many relationship;

said application roles entities by an optional one-to-many relationship;

said account roles entities by an optional one-to-many relationship;

00509353.103400

said device pool roles entities by a one-to-many relationship; and  
said packages entities by a one-to-many relationship.

13. The data model of Claim 7, wherein said unit packages entities relate  
said units entities to said packages entities by way of a many-to-one relationship  
5 with said units entities and a many-to-one relationship with said packages entities.

14. The data model of Claim 7, wherein said account role units entities  
relate said units entities to said account roles entities by way of a many-to-one  
relationship with said units entities and a many-to-one relationship with said  
account roles entities.

10 15. The data model of Claim 7, wherein said device pool role units entities  
relate said units entities to said device pool roles entities by way of a many-to-one  
relationship with said units entities and a many-to-one relationship with said device  
pool roles entities.

16. The data model of Claim 7, wherein said device pool roles entities  
15 represent software roles of a device pool, and wherein said device pool roles are  
related to:

said platforms entities by a many-to-one relationship;

0969353-103100  
001E01" E5E66960

said device pool role units entities by a one-to-many relationship;  
said device roles entities by a one-to-many relationship; and  
said device pool packages entities by a one-to-many relationship.

17. The data model of Claim 7, wherein said packages entities represent  
5 software packages, and wherein said packages entities are related to:

said unit packages entities by a one-to-many relationship;  
said platforms entities by a many-to-one relationship;  
said plurality of network entities by a many-to-one relationship;  
said included packages entities by at least one one-to-many relationship;  
10 said application packages entities by a one-to-many relationship;  
said device pool packages entities by a one-to-many relationship; and  
said account packages entities by a one-to-many relationship.

18. The data model of Claim 7, wherein said account packages entities  
relates said packages entities to said account roles entities by way of a many-to-one  
15 relationship with said packages entities and a many-to-one relationship with said  
account roles entities.

09699353 103100

5

10

15

21. The data model of Claim 7, wherein said dependent roles entities represent software roles dependent upon application software roles, wherein said dependent roles entities relate to said application roles entities by at least one many-to-one relationship.



5           23. The data model of Claim 7, wherein said application packages relate  
said packages entities to said application roles entities by way of a many-to-one  
relationship with said package entities and a many-to-one relationship with said  
application roles entities.

25. The data model of Claim 7, wherein said application roles entities  
represent software application roles, and said application roles entities relate to:  
15 said dependent roles entities by at least one one-to-many relationship;  
said application role units entities by a one-to-many relationship;  
said plurality of configuration entities by a one-to-many relationship;  
said plurality of network entities by a one-to-many relationship; and

26. The data model of Claim 1, wherein said plurality of configuration entities further comprises:

- 5 a plurality of conduits entities;  
a plurality of device role IP host entities;  
a plurality of interface IP type entities;  
a plurality of virtual IPs entities;  
a plurality of services entities;  
10 a plurality of role configurations entities;  
a plurality of device role configuration entities;  
a plurality of status entities;  
a plurality of component type entities; and  
a plurality of device role configuration values entities.
- 15 27. The data model of Claim 26, wherein said plurality of configuration  
entities further comprises a plurality of manufacturing model entities.

28. The data model of Claim 26, wherein said plurality of configuration entities further comprises a plurality of configuration entities further comprises a plurality of component objects entities.

29. The data model of Claim 26, further comprising a plurality of device  
5 roles history entities.

30. The data model of Claim 26, wherein said conduits entities represent communications portholes across a firewall via which two devices may communicate across the firewall, wherein said conduits entities relate to said plurality of hardware entities by a many-to-one relationship.

10 31. The data model of Claim 26, wherein said device role IP host entities relates an IP host address to a device role, and relates to:

said interface IP type entities by a many-to-one relationship;

said plurality of network entities by a many-to-one relationship; and

said plurality of software entities by a many-to-one relationship.

15 32. The data model of Claim 26, wherein said interface IP type entities represent allowed types of IP addresses within the network, and wherein said

09699353 103100  
D0T E0T " 15566960

interface IP type entities relate to said device role IP host entities in a one-to-many relationship.

33. The data model of Claim 26, wherein said virtual IPs entities represent virtual IP addresses that are used by a router to route traffic for a single IP address to multiple computers, and wherein said virtual IPs entities relates to:

said plurality of monitoring entities by a one-to-many relationship;  
said plurality of hardware entities by a many-to-one relationship; and  
said plurality of network entities by a many-to-one relationship.

34. The data model of Claim 26, wherein said services entities represent services to be performed by a series of applications accessible by a network server, and wherein said services entities relate to said software entities by an optional one-to-many relationship.

35. The data model of Claim 26, wherein said role configurations entities represent configurations related to software roles, and wherein said role configurations relate to:

said plurality of software entities by a many-to-one relationship; and  
said component type entities by a many-to-one relationship.

36. The data model of Claim 26, wherein said device role configuration entities represent configurations of software roles for specific devices, and wherein said device role configuration entities relate to:

5       said device role configuration values entities by a one-to-many  
relationship; and  
      said plurality of software entities by a many-to-one relationship.

37. The data model of Claim 26, wherein said status entities represent status conditions of various hardware and software objects, and wherein said status entities relate to:

10       said plurality of software entities by at least one one-to-many relationship;  
and  
      said plurality of hardware entities by a one-to-many relationship.

38. The data model of Claim 26, wherein said component type entities represent types of components used with the data model, and wherein said  
15       component type entities relate to said role configurations entities with a  
one-to-many relationship.

39. The data model of Claim 26, wherein said device role configuration values entities represent configuration values associated with software roles of a

09699353 103100

specific device, wherein said device role configuration values entities relate to device role configuration entities by a many-to-one relationship.

40. The data model of Claim 1, wherein said plurality of monitoring components further comprises:

- 5           a plurality of device request classes entities;
- a plurality of request class entities;
- a plurality of request class variables entities;
- a plurality of manager applications entities;
- a plurality of monitor ACLs entities;
- 10          a plurality of device application configuration entities;
- a plurality of device authorizations entities;
- a plurality of device ACLs entities;
- a plurality of SNMP variables entities;
- a plurality of ACL entries entities; and
- 15          a plurality of VIP groups entities.

41. The data model of Claim 40, further comprising a plurality of autonomous system map entities.

5           43. The data model of Claim 40 wherein said request class entities  
represent specific classes of requests that may be made, and wherein said request  
class entities relate to:

44. The data model of Claim 40 wherein said request class variables may be used to relate request classes associated with said request class entities with simple network management protocol (SNMP) variables associated with said SNMP variables entities by way of an optional many-to-one relationship with said request class entities, and optional many-to-one relationship with said SNMP variables entities.

45. The data model of Claim 40 wherein said manager applications entities relate the monitor access control lists (ACLs) represented by the monitor ACLs

5           **46. The data model of Claim 40 wherein said monitor ACLs entities**  
           **represent the monitoring of the ACLs for various devices on the network, wherein**  
           **said monitor ACLs entities relate to:**

said device ACLs entities by a one-to-many relationship; and .

10        said ACL entries entities by a one-to-many relationship.

said manager applications entities by a many-to-one relationship; and

15 said plurality of hardware entities by a many-to-one relationship.

48 The data model of Claim 40 wherein said device authorizations entities  
represent the authorization levels of particular devices, and wherein said device  
authorizations entities relate to:



said device ACLs entities by a one-to-many relationship; and

said plurality of hardware entities by a many-to-one relationship.

49. The data model of Claim 40 wherein said device ACLs entities  
represent device access control lists (ACLs) for specific devices on a network,  
5 wherein said device ACLs entities relate to:

said monitor ACLs entities by a many-to-one relationship; and

said device authorizations entities by a many-to-one relationship.

50. The data model of Claim 40 wherein said SNMP variables entities  
represent specific variables associated with the simple network management  
10 protocol (SNMP) used by devices on the network, wherein said SNMP variable  
entities relate to said request class variables entities by an optional one-to-many  
relationship.

51. The data model of Claim 40 wherein said ACL entries entities  
represent entries within an ACL, wherein said ACL entries entities relate to said  
15 monitor ACLs by a many-to-one relationship.

52. The data model of Claim 40 wherein said virtual IP (VIP) groups entities represent particular groups sharing virtual IP addresses, wherein said VIP groups entities relate to:

5       said plurality of configuration entities by a many-to-one relationship; and  
      said plurality of hardware entities by a many-to-one relationship.

53. The data model of Claim 1, wherein said plurality of hardware entities further comprises:

007E07" 65E6960  
09699353 103100  
10       a plurality of memory components entities;  
      a plurality of storage components entities;  
      a plurality of bus components entities;  
      a plurality of interface components entities;  
      a plurality of interface cards entities;  
      a plurality of devices entities;  
      a plurality of interface type entities;  
15       a plurality of device console entities;  
      a plurality of CPU components entities;  
      a plurality of SUB interfaces entities;  
      a plurality of circuits entities; and  
      a plurality of interface IPs entities.

54. The data model of Claim 53, wherein said memory components entities represent memory components, and wherein said memory components entities relate to said devices entities by a many-to-one relationship.

55. The data model of Claim 53, wherein said storage components entities  
5 represent storage components, and wherein said memory components entities  
relate to said devices entities by a many-to-one relationship.

56. The data model of Claim 53, wherein said bus components entities represent storage components, and wherein said bus components entities relate to said devices entities by a many-to-one relationship.

10                    57. The data model of Claim 53, wherein said interface components  
entities represent interface components, and wherein said interface components  
entities relate to:

said interface cards entities by a many-to-one relationship;

said interface type entities by a many-to-one relationship; and

15      said SUB interfaces entities by a one-to-many relationship.

58. The data model of Claim 53, wherein said interface cards entities represent interface cards for hardware devices, and wherein said interface cards entities relate to said devices entities by a many-to-one relationship.

59. The data model of Claim 53, wherein said devices entities represent  
5 hardware devices connected to the network, and wherein said devices entities relate to:

said memory components entities by a one-to-many relationship;

said storage components entities by a one-to-many relationship;

said bus components entities by a one-to-many relationship;

10 said interface cards entities by a one-to-many relationship;

said device console entities by a one-to-many relationship;

said CPU components entities by a one-to-many relationship;

said plurality of monitoring components by at least one one-to-many  
relationship; and

15 said plurality of configuration components by at least one one-to-many  
relationship and a many-to-one relationship.

60. The data model of Claim 53, wherein said interface type entities represent valid types of interfaces, and wherein said interface type entities relate to said interface components by a one-to-many relationship.

001001" 05060900

5           62. The data model of Claim 53, wherein said CPU components entities  
represent hardware CPU components, and wherein said CPU components entities  
relate to said devices entities by a many-to-one relationship.

said interface components entities by a many-to-one relationship; and

said interface IPs entities by a one-to-many relationship.

15           64. The data model of Claim 53, wherein said circuits entities represent  
specific hardware circuits, and wherein said circuits entities relates to said SUB  
interfaces entities by an optional one-to-many relationship.

said plurality of monitoring components by a one-to-many relationship; and

said SUB interfaces entities by a many-to-one relationship.

- a plurality of DNS hosts entities;
- a plurality of DNS host types entities;
- a plurality of DNS ACLs DNS ACLs entities;
- a plurality of DNS ACL entries entities;
- a plurality of DNS allow transfers entities;
- a plurality of DNS domain types entities;
- a plurality of DNS domains entities;
- a plurality of DNS allow queries;
- a plurality of DNS domain masters entities; and
- a plurality of DNS master IPs.

67. The data model of Claim 66, further comprising a plurality of DNS configuration entities.

68. The data model of Claim 66, wherein said DNS hosts entities represent DNS host devices, and wherein said DNS hosts entities relate to:

said DNS host types entities by a many-to-one relationship;

said DNS domains entities by a many-to-one relationship; and

5        said plurality of configuration entities by an optional one-to-many relationship.

69. The data model of Claim 66, wherein said DNS host types entities represent allowed DNS host types, and wherein said DNS host types entities relate to said DNS hosts entities in a one-to-many relationship.

10        70. The data model of Claim 66, wherein said DNS ACLs entities represent ACLs associated with specific DNS names, and wherein said DNS ACLs entities relate to:

said DNS ACL entries entities by a one-to-many relationship;

said DNS allow transfers entities by a one-to-many relationship; and

15        said DNS allow queries entities by a one-to-many relationship.

71. The data model of Claim 66, wherein said DNS ACL entries entities relate to said DNS ACLs entities by a many-to-one relationship.

09699353 103100  
007E07" E5E6960

72. The data model of Claim 66, wherein said DNS allow transfers entities relate to:

said DNS ACLs entities by a many-to-one relationship; and

said DNS domains entities by a many-to-one relationship.

5           73. The data model of Claim 66, wherein said DNS domain types entities represent the allowed types of DNS names for the network, and wherein said DNS domain types entities relate to said DNS domains entities by a one-to-many relationship.

10           74. The data model of Claim 66, wherein said DNS domains entities represent the various DNS domains of the network, and wherein said DNS domains entities relate to:

said DNS hosts entities by a one-to-many relationship;

said DNS allow transfers entities by a one-to-many relationship;

said DNS allow queries entities by a one-to-many relationship;

15           said DNS domain types entities by a many-to-one relationship;

said DNS domain masters entities by a many-to-one relationship; and

said plurality of network entities by an optional many-to-one relationship;.

0969353-103100  
DOTED "CES66960



75. The data model of Claim 66, wherein said DNS allow queries entities represent specific DNS queries allowed on the network, and wherein said DNS allow queries entities relate to:

said DNS domains entities by a many-to-one relationship; and

5        said DNS ACLs entities by a many-to-one relationship.

76. The data model of Claim 66, wherein said DNS domain masters entities relate DNS domains represented by said DNS domains entities and DNS master IPs represented by DNS master IPs entities by way of a one-to-many relationship with said DNS domains entities and a many-to-one relationship with  
10        said DNS master IPs entities.

77. The data model of Claim 66, wherein said DNS master IPs entities relate to DNS master IP addresses of the network, and relate to said DNS domain masters entities by a one-to-many relationship.

78. The data model of Claim 1, wherein said plurality of network entities  
15        further comprises:

a plurality of accounts entities;

a plurality of account configuration entities;

a plurality of account configuration values entities;

09699353 103100  
001E01" 65666960

5

a plurality of data center configuration entities;

a plurality of data centers entities;

a plurality of VLAN IP pools entities;

a plurality of VLAN pool type entities;

10

a plurality of VLAN sub type entities;

a plurality of IP addresses entities; and

a plurality of VLAN CIDR reserved entities.

15

80. The data model of Claim 78 wherein said accounts entities represent customer account on a network, and wherein said accounts entities relate to:

said plurality of software entities by at least one one-to-many relationship;

said account configuration entities by a one-to-many relationship;

said customer tiers entities by a one-to-many relationship; and

said plurality of DNS entities by an optional one-to-many relationship;.

81. The data model of Claim 78 wherein said account configuration entities represent configuration information of a customer account, wherein said account configuration entities relate to:

- 5           said accounts entities by a many-to-one relationship; and  
          said account configuration values entities by a one-to-many relationship.

82. The data model of Claim 78 wherein said account configuration values represent configuration values associated with configurations of customer accounts, and wherein said account configuration values relate to:

- 10           said account configuration entities by a many-to-one relationship.

83. The data model of Claim 78 wherein said customer tiers entities represent tiers of services accessible to customers on a network, and wherein said customer tiers entities relate to:

- said accounts entities by a many-to-one relationship;  
15           said VLAN compartments entities by a one-to-many relationship;  
          said data centers entities by a many-to-one relationship; and  
          said plurality of software entities by an optional one-to-many relationship;.

00699353.103100  
007E01" E5E66960

5

5

10

10

15

5            90. The data model of Claim 78 wherein said data centered tiers entities  
relate to said data centers entities and to said plurality of software entities by  
many-to-one relationships.

10           92. The data model of Claim 78 wherein said VLAN sub type entities  
relate to said VLAN IP Pools by a one-to-many relationship.

93. The data model of Claim 78 wherein said IP addresses entities relate to said VLAN IP pools by a many-to-one relationship, and to said plurality of configuration entities by at least one one-to-many relationship.

94. The data model of Claim 78 wherein said VLAN CIDR reserve entities indicate the CIDR VLAN addresses that are reserved for network operation and the addresses that are available for assignment.

95. The data model of Claim 1, wherein said queues entities further  
5 comprises:

- a plurality of agent queues entities;
- a plurality of agent queue commands entities;
- a plurality of agent command output entities;
- a plurality of agent commands entities; and
- 10 a plurality of agent command text entities.

96. The data model of Claim 95, further comprising a plurality of agent queue Mutex entities.

97. The data model of Claim 95, further comprising a plurality of agent command Mutex entities.

15 98. The data model of Claim 25 wherein said agent queues entities is used to indicate to agents a list of tasks to be performed and may optionally relate to

09699353 103100

99. The data model of Claim 25 wherein said agent queue commands  
entities relate to said agent queues entities and said agent commands in many-to-  
one relationships and to said agent command output entities in a one-to-many  
relationship.

100. The data model of Claim 25 wherein said agent command text entities relate to said agent commands entities by a many-to-one relationship.